

CLAIMS

1. A transducer for continuously and noninvasively measuring blood pressure
5 in a blood vessel (52) *characterized by*
 having integrated into a single semiconductor chip (41):
 - an array (20, 20b) of transducer or sensor elements (10, 10b),
 - means (21) for reading out data from said sensor elements (10, 10b),
and
 - means (22, 23, 24) for converting said data into a transmittable form.
- 10 2. The blood pressure transducer according to claim 1, *further including*
 interface means (44) for transmitting said data from said chip (41) to an
 external computer (45).
- 15 3. The blood pressure transducer according to claim 1 or 2, *wherein*
 the semiconductor chip is a CMOS chip.
- 20 4. The blood pressure transducer according to claim 1, *wherein*
 each sensor element (10) comprises a fluid-filled capacitive sensor having
 a flexible electrode or membrane (11) and a rigid electrode (13) and a fluid
 gap (12) connected to an opening (15).
- 25 5. The blood pressure transducer according to claim 1, *wherein*
 each sensor element (10b) comprises a resistive sensor having strain sen-
 sitive resistors on a flexible structure of cross-linked beams (16) a flexible
 protective membrane (11b) and a fluid gap (12b) connected to openings
 (15).

6. The blood pressure transducer according to any preceding claim, *wherein* the sensor elements (10, 10b) are arranged in a square array (20, 20b).
7. The blood pressure transducer according to claim 6, *wherein* 5 the array (20, 20b) comprises at least 2x2 sensor elements (10, 10b), preferably 4x4 sensor elements (10, 10b).
8. The blood pressure transducer according to claim 4 and 6, *wherein* 10 the array (20) comprises 2x2 sensor elements (10) arranged with adjacent openings (15) located in the center of said array (20).
9. The blood pressure transducer according to claim 7 or 8, *wherein* the array (20, 20b) of sensor elements (10, 10b) is placed close to one end of the semiconductor chip (41). 15
10. The blood pressure transducer according to an preceding claim, *wherein* the semiconductor chip (41) is part of a sensing device (40) which further includes a power source.
- 20 11. The blood pressure transducer according to claims 2 and 10, *wherein* the interface means (44) for transmitting the data from said chip (41) to an external computer (45) is a wireless transmission means.
- 25 12. A system for continuously and noninvasively measuring and monitoring blood pressure in a blood vessel (52), *characterized by* a sensing device (40) including a single semiconductor chip (41) having integrated

- an array (20, 20b) of sensor elements (10, 10b) overlying said blood vessel,
- means (21) for reading out data from said sensor elements (10, 10b),
- means (22, 23, 24) for converting said data, and
- means (44) for interfacing with external evaluation means (45).

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13. The measuring and monitoring system according to claim 12,
further including
a power source on the sensing device (40) and wireless means for
10 interfacing with the external evaluation means (45).

14. A method for making a transducer (41) for continuously and noninvasively measuring and monitoring blood pressure in a blood vessel (52)
including
15 fabricating on a single semiconductor chip (41) with conventional semiconductor technology, preferably CMOS technology,

- an array (20, 20b) of sensor elements (10, 10b),
- means (22, 23, 24) for converting, and
- means (44) for transmitting said data to external evaluation means

20 (45).

15. A method for using a transducer (41) according to any of the claims 1 to 11 or a system according to claim 12 or 13 for continuously and noninvasively measuring and monitoring blood pressure in a blood vessel (52)
characterized by

- extracting directional information from said continuous blood pressure measurement data to locate arteries and/or veins, and/or
- extracting characteristic signal features from said continuous blood pressure measurement data to differentiate between arteries and veins.

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16. A method for using a transducer (41) according to any of the claims 1 to
11 or a system according to claim 12 or 13 for continuously and noninva-
sively measuring and monitoring blood pressure in a blood vessel (52)

5 *characterized by*

- producing a map pattern of said continuous blood pressure meas-
urement data to identify abrupt features, in particular blockages due
to calcification inside arteries and veins.